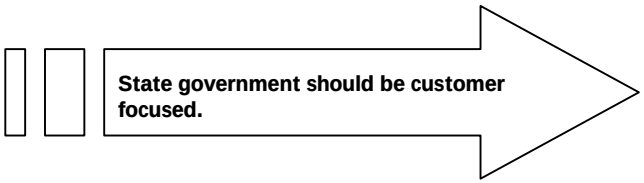
Issues and Recomendations

During the planning process, a number of issues kept recurring. These issues come from common themes in agency plans or are the result of discussions with agency staff, the legislative interim committee on information technology, executive branch management and other stakeholders. If North Dakota is going to achieve the four components of its information technology vision, then these issues must be addressed. Because of the impact on multiple agencies, these challenges need to be addressed at the enterprise level rather than by individual agencies.

This section outlines the most critical information technology issues and provides recommendations for addressing them. The issues are listed under the component of the information technology vision with which they are most closely identified, even though some issues may relate to more than one vision component. As part of the statewide planning process, Information Services Division (ISD) will monitor progress on each of the recommendations.



Issue: User training

If state employees are to become "knowledge" workers who use technology to access and analyze data, they need to have the skills required to use technology to its fullest. This includes the ability to use office automation products such as spreadsheets, word processing software and e-mail. They also need to understand how technology can be used to improve the services they provide and how to evaluate new technologies that may apply to their job. Managers need to know what questions to ask in order to make business decisions regarding technology projects that may be implemented to meet the needs of their customers. Employees generally don't receive the level of training needed for a variety of reasons. The most common reasons given are that they don't have the time, the agency doesn't have the budget or training is not available in the format needed.

Recommendations:

1. Guidelines should be established by ISD regarding the time and dollars that should be established in agency budgets for user training.
2. As part of the planning process, agencies should identify user-training needs and establish strategies for maintaining competencies.
3. Central Personnel should continue contracting at a state level for commonly requested user-training programs in order to get the lowest price.
4. ISD will continue to coordinate an information technology faire each year to showcase new technology and provide vendor seminars. ISD will schedule vendor presentations and information technology speakers on relevant topics that will be available to all state agencies
5. ISD will encourage user certification in the use of office automation software.

Resources required:
Additional dollars may be required in individual agency budgets to meet ISD guidelines once they are established.

Issue: Technical support for remote locations

In order to provide services that are convenient to their customers, a number of agencies have offices in various locations throughout the state. Each agency is responsible for providing the technology services and support necessary for those offices. Typically the remote offices receive their support from the central agency office in Bismarck and the technical support level is less timely than for employees in the Bismarck location.

Recommendations:

1. ISD should work with the agencies that have remote offices to develop a support strategy. Options considered should include:
   - Developing a statewide contract with vendors to provide support.
   - Hiring ISD or North Dakota University System (NDUS) staff in remote offices and charging the agencies for support services.
   - Locating agency technology support staff in remote offices and sharing services with other agencies.
   - Increasing the use of tools that will allow the support of users and management of information technology from a central location.

Resources required:
Funding will be provided through individual agency budgets. Depending on the support strategy selected, there may be implications for ISD's or NDUS' appropriation or authorized full time equivalent (FTE) count.

Issue: Maintaining compatibility with political subdivisions and other partners

State agencies work closely with political subdivisions to provide services to citizens of the state. As part of this process state agencies sometimes develop computer applications that are used by the political subdivisions. While the application is provided by state government, the equipment necessary to run or access the application is not. As technology changes, the applications need to be upgraded to take advantage of new features. Partners tend to implement technology at different rates depending on the expertise and funding available in their organization. Agencies sometimes need to reproduce the solution using multiple technologies or maintain old outdated technology until all the partners have the capability to advance.

Recommendations:

1. Planning for the maintenance and enhancements of applications needs to include considerations of the effect on agency partners. Total cost to the agency and its partners should be considered in the development of the cost-benefit analysis for implementing projects of this type. Agency information technology plans should include strategies for maintaining the technology level at partner locations for specific applications.
2. Counties and political subdivisions should be made aware of state standards. As part of ISD's coordination with political subdivisions, strategies should be developed to promote compatibility between state agencies and political subdivisions.

Resources required:
No additional resources required. Individual project plans will reflect the costs and benefits for maintaining compatibility with agency partners.

Issue: Project Coordination

North Dakota residents expect coordinated and seamless government service. In some cases, duplication can be eliminated and efficiencies gained by coordinating information technology projects across agencies. ISD has established standards to ensure that technical infrastructure supports information sharing and compatibility. However, because of the competition for limited resources, agencies are hesitant to provide resources to other agencies or ask for funding that does not directly benefit their agency. If the coordination effort results in benefits to one agency but the costs are borne by another "provider" agency, the provider agency places a low priority on the coordination effort and it has difficulty proceeding.

Recommendations:

1. All agencies will receive a copy of the statewide information technology plan so they can see the projects other agencies are planning. If they see benefit in a coordinated effort, they should make the other agency and ISD aware of the need for coordination.
2. ISD will review the agency plans and identify projects it feels need to be coordinated. Additional funding required by the coordination effort should be identified by ISD or the agencies effected.
3. ISD should identify projects that benefit multiple agencies but may not be identified as a priority in any individual agency plan. ISD should also identify projects necessary to achieve the overall vision for information technology. ISD should recommend an agency as the appropriate project sponsor and work with them to develop funding alternatives.
4. The Geographic Information System Technical committee along with ISD should determine the benefits that can be obtained from additional information sharing. Funding requests for specific projects should be submitted to the Office of Management and Budget (OMB).

Resources required:
At this point, no additional funding for coordinated projects in the 1999-2001 biennium has been identified. ISD's budget includes adequate dollars for preliminary project analyses.

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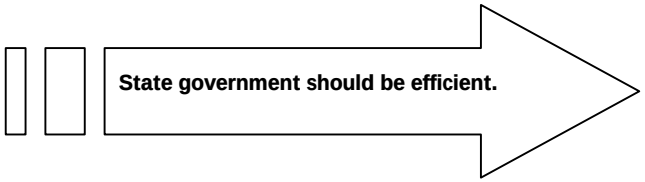

Issue: Business Process Improvements

Technology can be a useful tool that allows us to do things faster and more efficiently. However, technology by itself cannot provide breakthrough improvements in the services that state government provides. Some processes should not be automated but eliminated entirely. Processes developed based on "batch" processing and limited computer access are no longer appropriate and need to be totally redesigned based on the technology available today. Automating a cumbersome manual process will provide only minimal savings. The process itself needs to be analyzed to see if steps can be eliminated, time delays shortened or handoffs reduced.

Recommendations:

1. ISD will establish guidelines for identifying projects as potential candidates for business process analysis. Agencies will identify the potential for process improvements as part of the business case for new projects.
2. For large projects that have been identified as being potential candidates for process redesign, agencies should include business process assessment activities in their project plan.
3. ISD will analyze the need for process redesign services and develop strategies for providing those resources. ISD will identify external resources to provide those services if they cannot be provided internally.
4. ISD, with input from other agencies, should begin identifying barriers to process improvement within state government. Future planning efforts should include recommendations to improve processes on an enterprise level, for example purchasing procedures or payment processing.

Resources required:
Agency project budgets will include process redesign activities. If ISD is to begin offering process redesign services, additional FTE and appropriated dollars may be needed based on an analysis of the services required by agencies and cost recovery estimates. Additional funding will be required in ISD's budget to complete the task of analyzing processes on an enterprise level.

Issue: IT Planning Improvements

The 1997-99 biennium was the first time that state agencies were required to submit information technology plans. As a result of this first planning effort, a number of areas have been identified where the planning process can be improved to make it more efficient. The plans tended to focus on operational rather than strategic decision making. Because the information technology budget forms required different cost categories than the agency budget reports, agencies cannot reconcile the two sets of numbers. The level of third biennium budget detail information required was unavailable and resulted in guesswork on the part of agencies when filling in the forms. While there was too much detail in some areas, in others there was not enough detail to create useful summary reports on a statewide basis. Because the process was very iterative, the paper based reporting was cumbersome.

Recommendations:

1. ISD should develop a system for submitting and updating the plans electronically.
2. ISD should work together with OMB to develop a system for reporting technology costs that matches the Statewide Accounting Management Information System (SAMIS) system. The number of cost categories should be reviewed with agencies for usefulness and relevance.
3. Additional information will be required about specific technologies used by the agencies, their organizational capacity and plans to maintain and improve the services provided.
4. Detail budget information should not be required with the submission of the information technology plan on January 15 but should be reported with the agency budget to OMB.
5. Legislation should be amended to exclude boards and commissions from the planning process.

Resource requirements:
No additional resources required.

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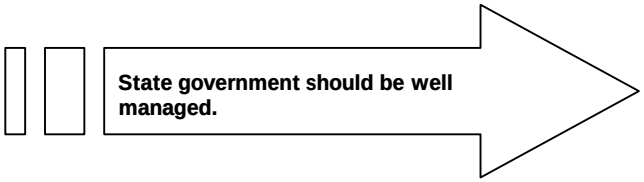


Issue: Project Management

The field of information technology traditionally has a poor track record in regards to delivering projects on time and within budget. State government in North Dakota also struggles with this issue. Project management is at times completely overlooked either because of understaffing or because the staff may not have the skills necessary to manage large projects. Projects sometimes get off to a poor start because the scope is inadequately defined or the business case is weak. In many cases, the agency abdicates its management responsibilities to a contractor or to ISD. This leaves the agency with very few options if the project begins to fail.

Recommendations:

1. The ISD planning section should develop a standard methodology for project management. Agencies will be required to use the methodology for large projects and will be encouraged to use all or portions of the methodology for smaller projects. The methodology will outline activities to be completed as part of project initiation including establishing a business case, identifying risks and opportunities, and evaluating the project's potential for process improvement as well as activities for monitoring and controlling project budget and schedule.
2. In order to build the capacity of state agencies to deliver successful projects, ISD will work with North Dakota University System to develop a project management curriculum to be offered to state agency personnel. The need for a project management certification program will be explored.
3. Project management standards and policies will continue to be expanded to include best practices developed by state agencies.
4. ISD will establish a process for quality assurance reviews of large projects.
5. Agency project budgets should reflect adequate resources for project management activities and quality assurance reviews.

Resources required:
Project management training will be offered to agencies on a fee for services basis. Funding for project management and quality assurance activities should be included in the project budget for the agency.

Issue: Attracting and retaining information technology professionals.

1. A critical element in managing technology is the retention of a highly skilled workforce capable of developing and supporting the necessary infrastructure. The number of technology positions in North Dakota is expected to grow by over 90% by 2005. Computer support specialist and programmer jobs in North Dakota had less than one applicant per opening from July 1997 to June 1998.[1] This tight market reflects the national statistics. The high demand is driving up salaries and forcing employers to find new ways to attract and retain technology staff. While private industry is facing the same challenges as state government, private businesses tend to have more versatility in their compensation packages, such as signing bonuses and project completion bonuses. The current state salary classification system addresses internal equity and provides options for addressing external market equity issues. However, agencies are not using the options available for a variety of reasons. Contractors have been used to supplement existing staff when vacancies have occurred but costs can be up to three times higher versus using state employees.

Recommendations:

1. North Dakota University System should take a lead role in developing and delivering "fast track" certification programs as well as traditional technology degree programs that meet the needs of government and private industry. These programs need to be marketed in North Dakota and also nationally to attract the number of technology professionals that will be needed.
2. Central Personnel should continue to review the job specifications and salaries of information technology positions. Job classifications that are significantly below market should be identified and guidelines

established for "market" salary ranges. Pay ranges for information technology positions may need to be extended to improve market equity. Central Personnel should also monitor turnover and retention rates for key information technology positions and develop additional strategies for maintaining adequate staffing if these rates are too high. Legislation changes allowing signing bonuses and project completion bonuses should be considered.

3. Agencies need to review salary administration policies and budgets and take advantage of options available to provide competitive salaries for information technology staff. Budget guidelines should provide direction to agencies regarding salary increases for technology staff.
4. Agencies need to adopt work policies and compensation options for employees or teams that fit the individual circumstances. Agencies need to understand and use the flexibility that exists in current policy administration. Creative use of flexible scheduling, telecommuting, continuing education and other options need to be used as tools to attract and retain qualified staff.

Resources required:
Individual agency budgets need to reflect increased salaries for information technology positions. Ongoing professional development and training should also be included in agency budgets as appropriate.

Issue: Managing hardware and software acquisition and replacement

With the advent of the personal computer came a number of issues related to managing workstations on the desktop of every employee. Because technology is changing so rapidly, hardware tends to have a life cycle of approximately three years, while software vendors market upgrades on an annual basis. Users need reliable equipment and software that is compatible with their co-workers to do their jobs efficiently. An analysis of the agency equipment budgets indicates that agencies may not be including adequate equipment replacement dollars in their budgets. Replacement cycles need to be budgeted and planned to minimize disruptions in workflow and frustrations for employees. If state government believes that information technology is essential to providing service efficiently then it must commit to maintaining an adequate level of functionality in each agency.

Recommendations:

1. Additional data needs to be collected to get a clearer picture of equipment and software replacement issues. In the next planning cycle, agencies will be asked to identify numbers of computers being purchased or replaced and identify their plans with respect to replacement cycle times. Changes to the OMB asset inventory system will be considered to track current numbers of computers.
2. Agency budgets need to adequately reflect replacement and upgrades as an ongoing cost and funding needs to be provided. Delaying this maintenance effort too long results in higher support costs and frustrated users.
3. Job Service currently has a project to evaluate thin clients. ISD will be working with Job Service, as well as other agencies, to evaluate alternative hardware options such as thin clients and network PCs to reduce the cost of hardware replacement.
4. The total cost of ownership for PCs includes the support time required for installation, troubleshooting and user training. The implementation of standards will help minimize these support costs. In addition, ISD will lead an effort by agencies to explore other options, such as centralizing certain network management functions, to reduce these costs.

Resources required:
Additional information collected in the next planning cycle will allow workstation replacement costs to be identified at the enterprise level. Individual agency budgets reflect current replacement cycles.

Issue: Network bandwidth requirements are increasing rapidly.

The management of network services is critical to ensure the reliability and availability of enterprise communications. The level of service provided needs to closely correspond to customer demand. Rapidly expanding use of the Internet is driving requirements for increased bandwidth on the network, particularly in higher education. While the network at one time transmitted primarily text or numeric data, it now also transmits graphics, audio and video formats. A single user can cause the degradation of service to everyone else on the network if they don't understand the implications of

what they are doing. The need for additional bandwidth may fluctuate wildly, making it difficult to provide adequate service during peak periods.

Recommendations:
1. ISD and the Higher Education Computing Network (HECN) should actively monitor use of the network and provide increased capacity as needed. Network services such as video conferencing, real audio and multi-casting will be actively managed to ensure that network capacity for other applications is maintained. Performance measures for network availability and response time should be established and monitored.
2. As part of the planning process, agencies should identify requirements for additional network capacity.
3. ISD should review agency plans and seek agency input about applications they may be planning that will impact the network. ISD will develop plans for network upgrades and expansion based on future agency requirements.
4. Contracts with telecommunication providers should include requirements for reporting bandwidth usage when appropriate.
5. Adequate funding needs to be provided to increase the network capacity for education, the state's primary network user.

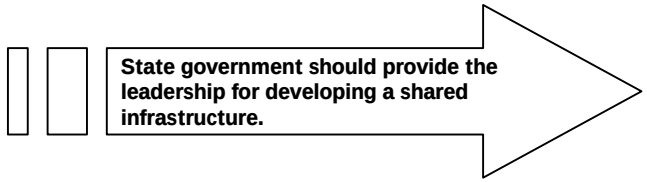
Resources required:
As the need for capacity increases, individual agency budgets will need to be increased to reflect the resources required.

Issue: Year 2000

The Year 2000 problem comes about because a number of systems have not been programmed to process data for the 21st Century. North Dakota needs to manage the tasks necessary to assess and minimize the risks associated with Year 2000 issues. State agencies are well on their way to identifying and fixing problems related to the Year 2000 "bug". At this point the state is not aware of any critical systems that will not be Year 2000 compliant when needed. However, it is possible that even the most rigorous approach will not identify every instance of failure ahead of time. In addition, state government is dependent on many outside service providers who may experience unforeseen problems. State agencies need to be prepared to recover quickly in the case of unanticipated failures.

Recommendations:
1. Funds should be appropriated for unforeseen expenses that may be incurred to resolve Year 2000 problems.
2. Agencies need to develop formal contingency plans for critical systems in case of failure.

Resources required:
The Office of Management and Budget is requesting funding to cover unforeseen expenses related to Year 2000. Individual agency budgets reflect planned expenditures for Y2000 remediation.



Issue: Expansion of the wide area network to remote locations including remote state offices, counties, schools and other political subdivisions.

The wide area network (WAN) is the most essential component of the state's information technology infrastructure. The network is key to providing public access to government services and delivering those services efficiently. Because the requirement for network service is expanding so rapidly, capital investment is necessary to deliver the capacity and performance needed to prevent degradation of service. Since the current cost recovery fee structure is based on distance, costs for WAN connections to remote locations can be prohibitive. It is difficult to justify the cost of the service and hence, high-speed network access is not widely available in small offices or educational facilities in remote locations. A variety of methods have been used to fund network expansion at different levels. State general fund dollars have been used to extend connectivity to schools through an Education Telecommunication Council (ETC) grant program. County connections to state agency applications have been provided by individual agencies. Due to the rapid expansion of the network and the

importance it plays in providing services, a different funding model may be needed.

Recommendations:
1. Depending on the outcome of related legislation during the upcoming session, ISD should initiate a feasibility study to determine specific objectives and establish priorities with regard to the expansion of the WAN to remote locations. The study should include input from legislative, state agency, education, city and county government representatives to analyze needs and identify benefits. Private provider and state network service provider options should be considered.
2. The study should consider various funding mechanisms for development and maintenance of the WAN including:
   - continuing the current cost recovery method,
   - aggregating costs by location or service to level out rates,
   - capital funding of high cost additions to the WAN,
   - grant funding targeted to specific locations or applications,
   - or a combination of the above.
3. ISD should continue to monitor emerging technologies and recommend their implementation when appropriate.
4. ISD should continue to encourage the development of Internet services by private providers in rural areas.

Resources required:
ISD will require funding for the feasibility study. Funding strategies recommended would be implemented in the 2001-2003 biennium.

Issue: The adoption of information technology by K-12 schools.

The statewide information technology planning process focused on managing technology from the perspective of state agencies. The state also has a role in providing the technology infrastructure for public education in the state. This responsibility includes providing the necessary educational technology to equip students with the knowledge, skills and abilities necessary to be productive citizens. The adoption of technology by schools requires up-to-date computers and software. Teachers and administrators need to know how to use the technology and integrate it into the curriculum and administrative processes. Currently, no guidelines exist at the state level that identify the technology programs necessary for this to happen. Each school or school district determines, based on their unique requirements and budget, the technology to be implemented at the local level. The results are the inconsistent adoption of technology by schools across the state.

Currently, the state provides funding for programs or grants at the state level to advance the use of technology in schools. Because these programs have been developed to meet specific needs, the result has been a fragmented set of programs rather than a comprehensive approach. Federal and private grants as well as local sources supplement the state programs. Examples of state programs include:
- SENDIT provides online resources for students and teachers, e-mail, a help desk, user support and training, web hosting and WAN connectivity services.
- The Center for Innovation in Instruction (CII) provides professional development services in the area of technology planning, curriculum integration and technology leadership.
- Five million dollars in technology reimbursement grants administered by the ETC in the 97-99 biennium.
- One million dollars through ETC grants in the 97-99 biennium.
- Legislation permitting the use of a local technology mill levy.

Because technology funding has come primarily through grant funding at the state and federal level, the entire cost of technology is not recognized as an ongoing operational expense by many schools or districts. State funded programs such as CII and SENDIT have been extremely well supported which may indicate that additional services should be offered on a state wide basis.

Recommendations:
1. The current level of state funding for educational technology programs should be maintained or increased.
2. ISD, in conjunction with Legislative Council and K-12 stakeholders, should initiate a study to determine specific objectives and establish priorities with regard to the funding of technology for K-12 institutions. The study should recommend a model for the implementation of educational technology that identifies the programs that should be available at the state level and that also identifies the responsibilities of

the local institution. Funding mechanisms for educational technology should be reviewed and changed as necessary to ensure that technology is adequately funded as an ongoing operational expense in all schools. The organizational structure for educational technology at the state level should be reviewed and a single entity should be given the responsibility for coordinating all state level educational technology programs. The entity should also be responsible for developing a comprehensive strategic plan for educational technology that will be updated every two years.

3. The entity responsible for education technology should establish reporting guidelines so that the degree of technology adoption by schools and the associated costs can be established and monitored.
4. The entity responsible for education technology should establish guidelines for the adoption of technology. The guidelines should encompass hardware, software, administrative reporting processes, pre-service teacher preparation, ongoing professional development, curriculum and networking related to the implementation of instructional and administrative technology.

Resources required:
At a minimum, the current level of funding for educational technology programs offered by SENDIT, CII, the ETC, the Department of Public Instruction and the Board for Vocational and Technical Education needs to be maintained. ISD will require funding to hire an independent consultant to complete the recommended study. Funding strategies recommended will be implemented in the 2001-2003 biennium. The entity responsible for education technology will require additional funding to establish guidelines and develop the strategic plan.

Notes:
1. The information was taken from the Job Services North Dakota web site.